

GENERAL NOTES

DISTRIBUTION OF BATS IN SOUTHEASTERN ARKANSAS

Bradley, Cleveland, and Drew counties lie in the West Gulf Coastal Plain and the Mississippi River Delta of southeastern Arkansas in a region where no caves or rock outcroppings occur. The climax vegetation is oak-hickory; forest types include upland hardwood, bottomland hardwood, and loblolly-shortleaf pine-hardwood (U. S. Forest Serv., 1950). Tree-farming operations have resulted in cleared lands and pine forests. Grazing lands and croplands make up about 13% of the total area of the three counties. (U. S. Dept. Commerce, 1961).

Sealander (1956) lists only seven specimens of two species from an area encompassing nine counties in the southeastern corner of the state. Sealander and Price (1964) recorded two specimens of *Tadarida brasiliensis* and a nursery colony of *Nycticeius humeralis* in Union County.

Between 1961 and 1965, specimens of nine species of bats were collected in the three counties listed above. Prepared specimens were deposited at Arkansas A & M College, University of Arizona, and Oklahoma State University.

Myotis austroriparius (Rhoads).—Sealander (1956) reported five specimens of *M. a. mumfordi* Rice, from Garland County, 12 miles NW of Hot Springs from a now inundated mine tunnel.

During this study three *Myotis* were obtained that appear to be referable to *M. austroriparius*; clearly they are not members of any other named species of *Myotis*. One specimen seems to be referable to *M. a. gatesi* Lowery. The affinities of the other two appear to be closer to *M. a. mumfordi* Rice.

On 21 March 1965 a male bat was collected 7 miles N of Warren, Cleveland County, as it flew over the Saline River. It appears referable to *M. a. gatesi*; its thick woolly dorsal hair has a bright orange wash and its ventral hair is yellowish orange. The skull has a well-developed sagittal crest. Glass and Ward (1959) reported this subspecies from extreme southeastern Oklahoma. The above specimen was compared to the Oklahoma specimens and no significant differences were found. *M. a. gatesi* has not been recorded previously from Arkansas.

On 25 August 1965 a *Myotis* was netted over a stock pond 1 mile S Arkansas A & M College, Drew County. This specimen is dorsally gray with a brownish sheen. The hair is distinctly bicolored. The ventral hair is white-tipped over a basal black. The hair does not have the woolly characteristic of the orange specimen. The rather delicate appearance of the brain case and absence of a sagittal crest indicate that the specimen is a young-of-the-year; however, the condition of the pelage and enlarged testes suggest an adult.

On 27 September 1965, 1 mile S of Arkansas A & M College over the same stock pond, a second *Myotis* was netted. This specimen, also a male, appears somewhat intermediate between the two specimens described above. The hair is woolly in nature but closer in color to the gray specimen, even though its dorsal color is light brown. The hair is distinctively bicolored. The ventral hair is black basally with a creamy white tip. Sagittal crest development also more closely resembles the gray specimen. This specimen compares favorably with specimens of *M. a. mumfordi* from Illinois in the University of Arizona collection.

Because only three specimens of *Myotis* are known from southeastern Arkansas, no conclusions concerning the above-mentioned variation have been made, despite the striking differences in color. Measurements of the three specimens do not provide conclusive evidence for subspecific assignment.

Lasionycteris noctivagans (Le Conte).—Sealander (1960) reported two specimens of *Lasionycteris noctivagans* from northwestern Arkansas. On 22 December 1965 five specimens were mist netted over L'Aigle Creek, 13 miles NW of Warren, Bradley County.

Pipistrellus subflavus (Cuvier).—The eastern pipistrelle is the third most common bat

in southeastern Arkansas. It was taken in limited numbers at most collecting sites. During the netting of 16–26 August 1965, only 16 were collected, in contrast to 177 red bats and 66 evening bats. This species appears to decrease in numbers in late August and September and was not seen flying during the winter months.

Eptesicus fuscus (Beauvois).—The big brown bat was found at three localities. A nursery colony inhabits the Administration Building on the Arkansas A & M College campus, Drew County. Two specimens were taken over small roadside pools in Saline River bottoms 6 miles N of Warren, Cleveland County. On 18 October 1965 three specimens were collected in nets over a farm pond 1 mile S of Arkansas A & M College.

Lasiurus borealis (Miller).—The red bat appears to be the most common bat in the area. In 6 nights between 16–26 August 1965, 177 red bats were netted.

On 20 August, 68 red bats were netted between 7:09 and 11:12 PM over L'Aigle Creek, 13 miles NW of Warren, Bradley County. The area netted was a small pool alongside a gravel road passing through bottomland hardwoods. On 22 December 1965 the pond was netted again and four *Lasiurus borealis*, 10 *Nycticeius*, and five *Lasionycteris* were collected.

All 21 *L. borealis* collected in December (1961–1965) were males. No other winter or fall collections were made.

Because bats often circled above and even attempted to light on the cage in which netted bats were retained, a mist net was set above the cage in an effort to determine the attracted species. Red bats were most commonly taken, although a few *Nycticeius* and *Pipistrellus*, and one *L. seminolus* were also captured. Presumably, these bats were attracted by calls made by the caged bats.

Lasiurus seminolus (Rhoads).—Sealander and Hoiberg (1954) reported a specimen of seminole bat from near New Port Landing on the Ouachita River near Smackover, Ouachita County. Another specimen was taken on 18 August 1965, 7 miles NW of Warren, Bradley County, in a mist net over a cage containing red and evening bats.

Lasiurus cinereus (Beauvois).—The hoary bat has been considered to be present only in limited numbers in Arkansas. Sealander (1956) reported six specimens from the state. On 16 August 1965 four adult males, with descended testes, were netted over a stockpond 8 miles NW of Warren, Bradley County. This pond is in a field near a dense upland hardwood forest. On 25 August 1965 an immature female was collected over a stockpond 1 mile S of Arkansas A & M College, Drew County.

Ten nights of netting in July 1966 produced nine additional individuals from Bradley County. Except for two lactating females, all were young-of-the-year.

Nycticeius humeralis (Rafinesque).—Although only 12 specimens of the evening bat were reported from Arkansas by 1956 (Sealander), our data indicate that this is probably the second most common bat in the southeastern part of the state. During 16–26 August 1956, 66 evening bats were collected in mist nets over water. They were present at all six water holes netted and were frequently caught in the decoy net.

Three nursery colonies of *Nycticeius* were found during this study. One in Warren, Bradley County, was situated in the wall of a Hampton Lumber Company building. A second, 3 miles SE of Warren, was in an abandoned building on the bank of the Saline River. The third was in a two-story dwelling between the chimney and the inside wall in Monticello, Drew County.

On 21 March 1963 only three torpid evening bats were found in the wall of the Hampton Lumber Company building. By mid-May the colony had moved in, and it remained until at least 8 September. On that date 210 bats were counted leaving the building between 6:35 and 6:45 PM (on 24 August 1962 the population was estimated at more than 1000).

Sex ratio of the 66 evening bats collected during 16–26 August 1965 was 59:41 (39 males and 27 females.) Females showed no external sign of lactation, and all males had enlarged testes. Apparently, young males, identified by degrees of phalanx joint ossification, develop enlarged testes which are indistinguishable from those of the adults.

Nycticeius is probably a winter resident of southeastern Arkansas, since 10 were collected on 22 December 1965 at L'Aigle Creek, 13 miles NW of Warren.

Plecotus rafinesquei (Lesson).—Handley (1959) reported only three eastern lump-nose bats from the state. On 26 September 1962 a male, testes descended, was taken 1 mile N of the Bradley-Cleveland County line, in a mist net set up in a vacant two-story house.

On 20 June 1963 a nursery colony was found 7 miles NW of Warren, Bradley County, in an abandoned building. The bats were clustered in a corner of a dimly lit room. They were active and made audible sounds even before disturbed. Thirteen bats were collected and about 15 others flew away. The young were considerably darker than the adults, and they could fly almost as well. All adults collected were females. On 13 July 1965 the house was revisited and three specimens were taken. Two were immature and showed no trace of post-juvenile molt. The adult was a male.

On 8 October 1963 a specimen was collected by Albert Etheridge from a well shaft in Drew County (Sec. 23, T 13 S, R 8 W).

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ROBT. J. BAKER AND CLAUD M. WARD, *University of Arizona, Tucson, and Department of Biology, Arkansas A & M College, College Heights. Accepted 22 August 1966.*

WINTER AND SUMMER CIRCULATORY CHANGES IN REFRIGERATED AND ACTIVE BATS, *MYOTIS LUCIFUGUS*

Menaker (1962) showed that the bat *Myotis lucifugus* exhibits seasonal differences in its ability to come out of hypothermia. Bats were unable to arouse from summer hypothermia at 4°C unless the environmental temperature was raised. Since changes in circulatory patterns, blood storage, blood volumes, and cell counts are important in the arousal of hibernating bats (Lidicker and Davis, 1955; Krutzsch and Hughes, 1959; Eliassen and Egsbaek, 1963; Kallen and Wimsatt, 1962; Grundboeck and Krzanowski, 1957), it seems logical to examine circulation in seeking the physiological basis for the difference noted by Menaker. Michael and Menaker (1963) could find no difference in the effect of temperature on the isolated hearts of summer and winter *M. lucifugus*.

Adult bats were collected in January in a cave in Carter County, Kentucky, and in July from a nursery colony in the attic of a house in Powell County, Kentucky. Bats from each